

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/EP2004/009269

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C09K11/06 B01J31/22 C07F15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C09K B01J C07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	S. LAI ET.AL.: "Carbene and isocyanide ligation at luminescent cyclometalated 6-phenyl-2,2'-bipyridyl platinum (II) complexes: structural and spectroscopic studies" ORGANOMETALLICS, vol. 18, 1999, pages 3327-336, XP002309654 the whole document	1-18
X	Q. LIU ET.AL.: "Synthesis, crystal structure and photophysical properties of N-heterocyclic carbene Pd(II), Pt(II) complexes and iodine adduct" POLYHEDRON, vol. 22, 15 June 2003 (2003-06-15), pages 1515-1521, XP002309655 the whole document	1-18

☒ Further documents are listed in the continuation of box C.

☐ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
 "&" document member of the same patent family

Date of the actual completion of the international search

9 December 2004

Date of mailing of the international search report

01.12.04

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>LAI S-W ET AL: "Luminescent metal complexes derived from carbene and related ligands: tuning excited-state properties with metal-carbon multiple bonds" JOURNAL OF ORGANOMETALLIC CHEMISTRY, ELSEVIER-SEQUOIA S.A. LAUSANNE, CH, vol. 617-618, 15 January 2001 (2001-01-15), pages 133-140, XP004315036 ISSN: 0022-328X the whole document</p>	1-18
X	<p>C.M. CHE ET.AL.: "[Pt(CN)(C10H21N4)}6]: A luminescent hexanuclear platinum(II) macrocycle containing chelating dicarbene and bridging cyanide ligands" ANGEW.CHEM.INT.ED., vol. 37, no. 1/2, 1998, pages 182-184, XP002309656 the whole document</p>	1-18
X	<p>W. XUE ET.AL.: "Spectroscopic and excited-state properties of luminescent rhenium (I) N-heterocyclic carbene complexes containing aromatic diimine ligands" ORGANOMETALLICS, vol. 17, 1998, pages 1622-1630, XP002309657 the whole document</p>	1-18
X	<p>P. HITCHCOCK ET.AL.: "Synthesis of homoleptic tris(organo-chelate)iridium(III) complexes by spontaneous ortho-metallation of electronrich olefin-derived N,N'-diarylcarbene ligands and the X-ray structures of fac-[6H3Me-p}3] and mer-6H3Me-p}2 {C6H4Me-p}Cl (a product of HCl cleavage)" JOURNAL OF ORGANOMETALLIC CHEMISTRY, vol. 239, 1982, pages C26-C30, XP002309658 cited in the application the whole document</p>	9-18
X	<p>S. GRÜNDEMANN ET.AL.: "Abnormal ligand binding and reversible ring hydrogenation in the reaction of imidazolium salts with IrH5(PPh3)2" J. AM. CHEM. SOC., vol. 124, 2002, pages 10473-10481, XP002309428 cited in the application the whole document</p>	9-18

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International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see supplemental sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-18

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

Box III

The International Searching Authority has determined that this international application contains multiple (groups of) inventions, as follows:

1. Claims 1-18

Use of neutral transition metal complexes containing at least one carbene ligand in organic light-emitting diodes.

Neutral transition metal complexes containing at least one carbene ligand.

2. Claim 19

Use of neutral transition metal complexes containing at least one carbene ligand for the mass dyeing of polymer materials.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	A. CHIANESE ET.AL.: "Rhodium and iridium complexes of N-heterocyclic carbenes via transmetalation: structure and dynamics" ORGANOMETALLICS, vol. 22, 13 March 2003 (2003-03-13), pages 1663-1667, XP002309659 the whole document	9-18
X	T. WESKAMP ET.AL.: "N-heterocyclic carbenes: novel ruthenium-alkylidene complexes" JOURNAL OF ORGANOMETALLIC CHEMISTRY, vol. 582, 1999, pages 362-365, XP002309660 the whole document	9-18
X	K. COLEMAN ET.AL.: "Silver(I) complex of a new imino-N-heterocyclic carbene and ligand transfer to palladium(II) and rhodium(I)" DALTON TRANS., 18 June 2003 (2003-06-18), pages 2917-2922, XP002309661 the whole document	9-18
X	R. DOUTHWAITE ET.AL.: "Cationic and neutral palladium(II) methyl complexes of di-N-heterocyclic carbenes" J.CHEM. SOC., DALTON TRANS., 2002, pages 1386-1390, XP002309662 the whole document	1-18